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Minerals from the Carpathians in an eighteenth-century British collection

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Abstract – The Woodwardian Collection of the Sedgwick Museum of the University of Cambridge (Cambridge, United Kingdom) is probably the oldest intactly preserved earth science collection in the world. Among its ca. 9,400 specimens (1,574 foreign) it holds 68 specimens of minerals, fossils, and other objects of curiosity, derived from the Carpathians. Local collectors and travellers supplied JOHN WOODWARD (1665–1728), the famous London physician and naturalist with the specimens, which he carefully stored, registered in a catalogue and used as evidences for his natural history studies. Although scattered among other specimens, the Carpathian specimens possibly constitute the oldest existing mineral collection of this region. Most specimens derive from the mining districts of Lower Hungary (now Slovakia) and from Transylvania (now Romania). Collectors, localities and minerals are identified. Appendix 1 lists the entries of Carpathian minerals in WOODWARD's catalogue. With 2 figures and 2 tables.

Dedicated to the 150-year-old
Hungarian Geological Society
1848–1998

INTRODUCTION

This paper intends to call attention upon a collection, which hides treasures concerning the history of earth sciences of the Carpathians. The Woodwardian Collection, dated from the early eighteenth century, is probably the oldest intactly preserved geological collection in Europe (PRICE 1989). It is in the Sedgwick Museum in Cambridge. Its specimens and their arrangement reflects the ideas of the collector, JOHN WOODWARD (1665–1728), an eminent English medical doctor and naturalist. His catalogue of the collection, his scheme of classification and his treatise on the origin of geological objects all have been printed.

The collection holds 68 specimens from late seventeenth- to early eighteenth-century Hungary (now Slovakia, Hungary, and Romania). We made an attempt to identify the collectors and the localities. Identifying the specimens is preliminary only, and is based on the information contained in the entries of the printed catalogue. A precise identification should need the on-site studies of an expert mineralogist in Cambridge, and detailed investigations beyond visual inspection. Appendix 1 contains the relevant entries of the catalogue supplemented by remarks on the specimens.

Some paragraphs of this paper has originally been published in the *Journal of the History of Collections* (KÁZMÉR 1998). This version provides full details of Carpathian records in the catalogue, supplemented by remarks on the specimens preserved in Cambridge. Significant additions concern the collectors as well.

Sixteenth- to eighteenth-century catalogues of mineral collections, especially those drawn up by scholarly collectors are of special importance to the history of mineralogy, as their number considerably exceeds that of contemporaneous mineralogical textbooks. These catalogues reflect not only the views on the system of mineralogy but, in lack of contemporary topographical mineralogies, provide unique information on the mineralogical knowledge of the then known world and sometimes even the contacts among collectors can be traced from them.

From our point of view these catalogues have a special importance. Hungary (at that time extending practically to the whole area within the range of the Carpathians), was one of the birthplaces of mineral collecting (WILSON 1994), and many contemporary documents refer to mineral collections (PAPP *et al.* 1991, PAPP 1994). The oldest preserved catalogues and specimens, however, are not earlier than the late eighteenth century, due to the stormy history of this territory. Data on early collectors and collections in the Carpathian area are scattered in catalogues of collections accumulated in other countries. This study is part of a systematic effort in gathering and interpreting collecting-related data from the region.

JOHN WOODWARD (1665–1728)

JOHN WOODWARD was the foremost British geologist of the period preceding HUTTON, SMITH and LYELL. He was born in Wirksworth, Derbyshire, England, on May 1, 1665. He studied medicine and natural sciences in the house of Dr. PETER BARWICK, Physician in Ordinary to King CHARLES II. From 1692 he was "professor of physick", i.e. medicine in Gresham College, then the only university of London, until his death in 1728. In 1693 he was elected Fellow of the Royal Society.

WOODWARD's interest in geology was aroused by a botanical visit to the Cotswolds, studded with exposures of richly fossiliferous Jurassic rocks. Here he first became aware of the existence of fossil remains of marine organisms.

The first fruit of his new interest was a book entitled *An Essay Toward a Natural History of the Earth* (1702), which has been reprinted several times and was translated into Latin, French, Italian, and German. It advocated and emphasized that fossil remains were organic in origin, a view by no means universally accepted at that time, some still

believing them as sports of nature, formed within the rocks by some obscure process. At the same time the theory claimed that the distribution of rocks and their fossil contents in successive beds or strata was a direct result of the universal deluge. This can be considered a dubious merit today, but we ought to remember, that diluvialists had the greatest role in making the organic origin of fossils accepted by naturalists (EYLES 1965, 1976, RUDWICK 1985, p. 88).

In succeeding years WOODWARD gathered together, at Gresham College, a very large collection of fossils, minerals and other "curiosities", which he described carefully, noting information such as locality, mode of occurrence and the collector's name.

WOODWARD's passion as a collector resulted in the appearance of further two books from his pen. The first, titled *Fossils of all Kinds, Digested into a Method* (1728) is essentially a textbook of mineralogy, with a systematic classification of minerals, and an indication of methods to be used in identifying them. The other book, published posthumously in 1729 bears the title *An Attempt Towards a Natural History of the Fossils of England*. The term "fossil" includes both minerals and remains of organisms. The book is an accurate catalogue of his collection, listing both English and foreign specimens.

WOODWARD's classification involved a breakdown into six classes, Earths, Stones, Salts, Bitumens, Minerals, and Metals. This classification had generally been adopted with some modifications in the contemporary science from AVICENNA's era till WERNER (KOBELL 1864, LAUDAN 1987).

For the safekeeping of his collection and to promote further studies in his fields of interest, he bequeathed his fortune to the University of Cambridge to establish a Woodwardian Chair of Geology. The Chair was the first in Britain – and possibly in the world – specializing in this branch of science. It still exists today, and one of the duties of the Woodwardian Professor is "to shew the said Fossils *gratis* to all such curious and intelligent persons as shall desire a view of them for their Information and Instruction" (EYLES 1965, PORTER 1979).

THE COLLECTION

WOODWARD's collection – although rearranged – still exists today, preserved in its original walnut cabinets (PRICE 1989). As there are only WOODWARD's specimens in the drawers, the collection is actually a fossil itself: it displays easily readable information about the thinking of JOHN WOODWARD, one of the foremost naturalists of his age. Unraveling the theoretical and cultural background of his collecting, describing it in modern terms, and relating it to contemporary trends of thought will be the subject of another paper; here we discuss that part of the vast collection only, which relates to the Carpathian region.

While there were many local collectors and collections mentioned in contemporary literature (e.g. the Imperial Collection in Vienna), the material of these has been mostly lost, or – if preserved – dissolved within subsequent collections, and extensive studies are needed to identify them. The unique value of the Woodwardian Collection – although containing a relatively minor amount of specimens from the Carpathians only – is that it

is readily available for studies of modern standards. The Woodwardian Collection can be considered as the oldest mineral collection from the Carpathian region.

While most of his material (four of the five cabinets) comes from Britain and was collected by himself, the foreign material is also impressive. It came from most countries of Europe, from North America and from Asia. It contains minerals in the modern sense, rocks, fossils, and very few artefacts (Neolithic axes and pieces of copper precipitated on iron). Many of the specimens lack the aesthetical character needed for a museum exhibit today, since the collection was amassed strictly for scientific purposes and not as a curiosity chamber, unlike its contemporaries (e.g. SLOANE's collection). The cabinets, hiding drawers behind compact doors, closed by intricate locks suggest, that the collection served no entertainment; although we know, that WOODWARD showed it to many of his visitors (LEVINE 1991).

The catalogue records 7,364 entries for 9,377 specimens in the collection (PRICE 1989). Foreign specimens count 1574. Altogether 68 entries describe specimens derived from the Carpathians and from the Pannonian Basin (see Appendix 1). Four other entries contain remarks related to Carpathian minerals (see in the chapter on WEBER). Twelve collectors, both foreign travellers and residents in the region are identified as senders of the Carpathian material.

The catalogue consists of twelve subsections (PRICE 1989, his Appendix 1), grouping "native fossils", i.e. rocks and minerals, and "extraneous fossils", i.e. which were deposited in the layers by the Deluge – these are the remnants of animals and plants. British and foreign fossils are listed in different subsections. As obviously the first cataloguing was finished in the late 1710s, subsequent additions were grouped in additional subsections, and all sections now total twelve. Each subsection is subdivided to show WOODWARD's detailed classification system. The classes are named in Latin and English.

Entries are numbered by Greek letters and Arabic numerals. Each entry contains a descriptive name of the specimen, often in Latin. Name of the collector and the locality where it was found is given very precisely. There are remarks on the location, on the outer characters of the specimen, on its uses, and comparisons with similar specimens from other localities. An opinion of a certain Mr. WEBER, a native of Hungary, is added to the description of several specimens.

THE COLLECTORS

Most entries in WOODWARD's (1729) catalogue denote the person, from whom he has got the specimen. They are travellers, local collectors or collectors in other lands, who sent foreign material for exchange. For a few specimens it is possible to recognize the way it was sent from the original collectors through subsequent exchanges to its final resting place in WOODWARD's collection.

BREYNIUS

BREYN, JOHANN PHILIPP (1680 Danzig, Prussia – 1764 Danzig, Prussia) was a well-known doctor and naturalist in Danzig (now Gdansk, Poland). He studied medicine in

Leyden. Accounts of his voyage in Italy were published in the Philosophical Transactions of the Royal Society of London, of which he was a member. BREYN published several works, mainly in botany, and also on fossils (*Dissertatio de polythalamiis, nova testaceorum classe; adjicitur commentarius de Belemnitis Prussicis*, 1732) (MICHAUD 1854–). He had a natural history collection including minerals; its auction catalogue was published in 1765 (WILSON 1994). BREYN has sent WOODWARD two mineral specimens from Hungary.

BROWN

BROWN, EDWARD (1644, Norwich, England – 1708, Northfleet, Kent, England) studied medicine in Oxford and London. He travelled extensively between 1668 and 1673 in Italy, France, Holland, Germany, Austria, Hungary, and Greece. It is by the descriptions of his journeys that he is best known (BROWN 1673). Wherever he went he observed all objects natural or historical, as well as everything bearing on his profession. He published in 1673 a small volume called *A brief Account of some Travels in Hungaria, Styria, Bulgaria, Thessaly, Austria, Servia, Carynthia, Carniola, and Friuli*. Not only a second edition of this book was published in 1687, but it was translated into several European languages. In 1667 he has been elected Fellow of the Royal Society. He was president of the College of Physicians 1704–1708 (Dictionary of National Biography). WOODWARD received nine specimens from BROWN.

CHISHULL

CHISHULL, EDMUND (22 March 1671, Eyworth, Bedfordshire, England – 18 May 1733, Walthamstow, Essex, England) studied divinity at Oxford. He spent four years in Smyrna as chaplain of the Turkey Company. In 1702 he returned to England overland as a member of the household of the British ambassador to the Porte, Lord PAGET. They travelled through Bulgaria, Transylvania, Hungary, Germany and Holland. His account, titled *Travels in Turkey and back to England* was published posthumously in 1747 (Dictionary of National Biography **4**: 263–264). WOODWARD's collection contains three specimens from CHISHULL. They were most probably donated by SÁMUEL KÖLESÉRI (q.v.) to CHISHULL on 18th May, 1702. CHISHULL noted in his book that at *Visakna* [= Vízakna, now Ocna Sibiului] he received "a present of some *specimina metallica*, namely gold, cinnabar, antimony, and others", which were sent him "by a gentleman, named *Samuel Koloseri*, the Emperor's general inspector of the Transylvanian mines."

DU MONT

At the moment we are unable to identify OLIV[IER?] DU MONT. He certainly travelled in Hungary and visited the Schemnitz mines. The Woodwardian Collection contains seven of his specimens from Hungary.

KISNER

KISNER, JOHANN GEORG (first half of 18th century). German physician and collector of general natural history in Frankfurt am Main. He had a collection of 700 mineral specimens (WILSON 1994). WOODWARD received two Hungarian specimens from KISNER.

KÖLESÉRI

WOODWARD (1729) mentioned him as M. *Sam. Robeseri* (An Addition to the Catalogue of the Foreign Native Fossils, p. 14). The name was mis-spelled by WOODWARD; the correct form is *Sámuel Köleséri*.

KÖLESÉRI, SÁMUEL (18 November 1663, Szendrő, Hungary – 24 December 1732, Hermannstadt, Transylvania) studied theology, philosophy, and medicine in Leyden and Franeker, Holland. He was chief physician of Transylvania, and supervisor of the mines there. He published widely on philosophy, theology, medicine, history, law, and philology. His treatise on the gold mining of Transylvania: *Auraria Romano-Dacica* (1717) is of lasting value. KÖLESÉRI assembled a library of four thousand volumes in all the fields of his interest (BERTÓK 1955). He was elected the first Hungarian member of the Royal Society in 1729 (CSÍKY 1992). He corresponded with many persons of significance, among others with Sir HANS SLOANE (GÖMÖRI 1989) and JOHANN JAKOB SCHEUCHZER (VÖRÖS 1983; JAKÓ in press). SCHEUCHZER's *Herbarium Diluvianum* contains a dedication to KÖLESÉRI (KÁZMÉR 1997).

WOODWARD received only two specimens directly from KÖLESÉRI, although the three Hungarian specimens given to him by CHISHULL and the three by SCHEUCHZER had been possibly the donations of KÖLESÉRI to those collectors.

LEOPOLD

LEOPOLD, JOHANN FRIEDRICH (2 February 1676, Lübeck, Germany – 4 May 1711, Lübeck, Germany). German physician in Lübeck. He took a six-year-long travel to Italy, England, France and the Netherlands before graduating in Zürich in 1700. Having returned to Lübeck, he collected a nice rarity chamber. He had a wide correspondence with contemporary scholars (JÖCHER 1750), among them with WOODWARD, who inspired his trip in 1706/7 to Denmark and Sweden including visits to the Swedish mines (PRICE 1989). An account of this journey in the form of letters to WOODWARD (*Relatio epistolica de itinere suo suecico ann. 1707 facto, ad Doct. Ioan. Woodward*) was published posthumously in London by WOODWARD in 1720. The Woodwardian Collection holds 13 specimens from Hungary, donated by LEOPOLD.

LINCK

LINCK, HEINRICH (? – 1717), German pharmacist in Leipzig, founded the family's famous natural history collection (WILSON 1994). His son, JOHANN HEINRICH (17 December 1674, Leipzig, Saxonia – 29 October 1736, Leipzig, Saxonia) studied pharmacy in Leipzig and Copenhagen. Following travels to Holland and England he returned to Leipzig, and opened a chemist's shop. He became famous for his "Naturaliencabinet" and for his library in the sciences. The catalogue of his collections was published after his death as *Index musei Linckiani* (1783–1787) by his son of the same name. His major zoological work titled *De stellis marinis* (1733) was the authoritative treatise of sea-stars for more than a century. JOHANN HEINRICH LINCK was member of several academies (Allgemeine Deutsche Biographie). He dedicated his book *Epistola de sceleto Crocodili in Lapide* (Lipsiae, 1718) to WOODWARD. The Woodwardian Collection holds a single Hungarian specimen from the Linck collection.

NEWTON

NEWTON, ISAAC (5 January 1643, Woolsthorpe, England – 31 March 1727, Kensington, England) studied mathematics and physics in Cambridge. He held the chair of mathematics there from 1669. He was member of the Royal Society since 1672, and its president since 1703 until his death. He already published his major works on gravity and optics, when he was appointed supervisor of the Mint in London in 1695 (COHEN 1964). He was greatly interested in speculative and mystical alchemy (PARTINGTON 1961). In 1669 he wrote to a friend planning a tour of Europe, asking if he would acquire for him mineral specimens, among them mercury ores (WILSON 1994). The Woodwardian Collection holds a single Hungarian specimen donated by NEWTON.

SCHEUCHZER

SCHEUCHZER, JOHANN JAKOB (2 August 1672, Zürich, Switzerland – 23 June 1733, Zürich, Switzerland) studied science and medicine in Altdorf and Utrecht, and mathematics in Nuremberg. The fossil collection that he began assembling in 1690 soon became famous and brought him to the attention of the scholarly world. Upon returning to Zürich he became municipal physician, head of the Bibliothèque de Bourgeois, director of the Museum of Natural History; in 1716 he became professor of mathematics. SCHEUCHZER carried on correspondence with more than 700 European scholars. His published works include *Helvetiae stoicheiographia* (1716–1718), the first description of the natural history of the Alps; and *Herbarium diluvianum* (1709, 1723), which founded the science of palaeobotany (PILET 1975). He was an admirer of WOODWARD, and translated his *An Essay Towards a Natural History of the Earth* to Latin, to make it available to the learned world (EYLES 1971, p. 419). He donated 278 specimens to WOODWARD's collection (PRICE 1989). SCHEUCHZER sent three Hungarian mineral specimens to WOODWARD, which he possibly got from KÖLESÉRI.

SCHÖNBERG

Members of the SCHÖNBERG family were the superintendents of the mines in Saxony between 1558 and 1761. The most famous of them was ABRAHAM VON SCHÖNBERG (1640–1711), being superintendent from 1676 (FISCHER 1943). SCHÖNBERG supplied 183 specimens of minerals to WOODWARD (PRICE 1989). The Woodwardian Collection holds six Hungarian specimens donated by SCHÖNBERG.

WEBER

WOODWARD (1728) mentioned him as "Mr. WEBER, who is a Native of Hungary, and has been long conversant in the Mines there, as likewise in those of Saxony" (Part I, p. 3), or "Mr. WEBER, who is an Hungarian and has been long conversant in the Mines of that Country, and of Saxony" (Part I, p. 5).

At the moment we are unable to identify WEBER. Probably he was a mining engineer or supervisor, who held posts both in Saxonia and in Lower Hungary. Based on his opinion about a specimen from India, correcting the original determination of the sender, we are allowed to think, that he has visited WOODWARD and gave expert opinion about his minerals. The Woodwardian Collection holds two specimens donated by WEBER.

Some of his comments on specimens from outside of the Carpathians has to be quoted here because of their reference to Carpathian minerals. He mentioned that the "red transparent Spaad" (= calcite) and "the white Spaad or common Lime, where Spaad is not to be got [are used] as an Absorbent of Sulphurs, in running the Silver and Copper-Ores, all over *Germany* and *Hungary*, at the great Smelting Works." (Part I, p. 14). Another remark of WEBER to a loadstone specimen states that "they sometimes find the Magnet in the Veins along with iron, in Saxony; and very commonly in the Upper Hungary. They smelt and run it down with the Iron-Ore" (Part I, p. 47). Probably WEBER is the source of the remark that a hair-like native silver, which "is found in small Quantities among the Spar of the Veins" at Freiberg in Saxony is "found in the like manner as *Schemnitz* in *Hungary*" (Part I, p. 31). According to another anonymous comment on an unspecified rich silver mineral from the Upper Palatinate (Germany) "there is also of this sort of Ore got at Schemnitz".

THE CARPATHIAN SPECIMENS AND LOCALITIES*

The specimens

Collecting – as opposed to sampling – is aimed at an individual object bearing interest for the collector. The Carpathians were a distant region for the average gatherer of the turn of the 17th–18th centuries; we suppose, that by making their choice among the minerals available in their time reflects more than aesthetical preferences. Chance may have been a factor, of course, in determining what specimens found their ways into the Woodwardian Collection, although we suppose that the doctor did not include each and every specimen received. What were the interesting specimens derived from Hungary? We attempted to classify the specimens by their essential features. Six classes are recognised: precipitations, alchemy-related minerals, ores of noble metals, ores of base metals, pyrites s.l., and curiosities (Table 1). The "scholarly character" of the collection is obvious. Hungarian mines supplied lots of beautiful minerals: "there are also found in these [Schemnitz] Mines, *Crystals*, *Amethysts*, and *Amethystine* mixtures in the clefts of the Rocks, and sometimes nigh or joyned to the Ore" (BROWN 1673), but no such specimens are found in the collection, and only three items can be regarded as "curious specimens", but their curiosity is of rather scientific character.

Precipitations were of scientific interest obviously as products of contemporaneous mineral formation. At least four specimens from them were presented by BROWN (q.v.), who systematically visited thermal springs and outflows of mine-waters and collected their products, "being desirous to see what alterations divers of those Mineral-waters in that Country, would make upon Metals..." (BROWN 1673). As the quotation already indicates the last kind of precipitations, precipitated or cement copper, can also be grouped with alchemy-related materials, as many contemporary alchemist regarded this process

* Only a general survey of the specimens and localities is given here. The catalogue entries and specific remarks to the specimens and localities are found in the Appendix.

Table 1. Distribution of Carpathian specimens according to their nature

mountain green (incl. bone turquoise)	3	
calcareous precipitation	3	
precipitated copper	6	
precipitations		*12*
vitriol	6	
orpiment and realgar	3	
cinnabar	7	
stibnite	7	
alchemy-related minerals		*23*
gold ore	6	
silver ore	12	
ores of noble metals		*18*
copper ore	2	
lead ore (?)	1	
ores of base metals		*3*
pyrite, marcasite and sulphur		*6*
amiant and asbestos	3	
septaria	1	
fossils (excl. bone turquoise)	2	
"curiosities"		*6*
Altogether	68	*68*

an evidence of transmutation (the transformation of one metal into another). We have no space here even for a brief survey of the rich literature of the Hungarian precipitated copper (for a list see e.g. SZATHMÁRY 1928). Earliest reports on the production of precipitated copper date back to the sixteenth century (e.g. AGRICOLA 1546) and this process has been of a considerable economic importance until the nineteenth century.

It may be suspicious to our common sense that the great number of *alchemy-related minerals* of the collection also proves its scientific character, since chemistry was strongly related with alchemy in that time.

Different kinds of *vitriol* were among the most interesting materials. Hungarian (copper) vitriol was highly esteemed by alchemists as reported by PARACELSUS in his *Hermetische Nord-Stern* (quoted by SZATHMÁRY 1928). WALLERIUS (1750) in his Mineralogy also mentioned *Vitriolum Hungaricum*, which was "much sought after by the adepts". BROWN, supplier of two vitriol specimens, was eager to visit an occurrence of Hungarian vitriol. In the baths of "Glas-Hitten" meeting a men "and finding that he had employed in the Mines, I asked him among other things, whither he had seen any natural Vitriol, and where, in the Mines, crystallized in lumps, pure and ready for use (...) And

Table 2. Distribution of Carpathian specimens among localities

German or English / Hungarian / Slovak name	pcs	pcs
Kremnitz / Körmöcbánya / Kremnica	4	
Lupscherseiffen / Magurka / Magurka	4	
Neusohl / Besztercebánya / Banská Bystrica*	10	
Schemnitz / Selmecbánya /Banská Štiavnica*	17	
Lower Hungary (probably)	2	
Lower Hungarian mining district		*37*
Upper Hungarian mining district		*1*
Danube (up to Komorn / Komárom / Komarno)	1	
Buda	1	
Other Hungarian (s. str.) localities		*2*
Transylvanian Ore Mts		*2*
unknown or unidentified locality		*26*
Altogether	39	*68*

*: and/or surroundings

accordingly, two or three days after (...) we went with him under ground, till I came where he shew'd me great quantities of it, much to my satisfaction: the Vitriol there shooting upon the Stones and Earth, upon the floor and sides of the passages, as it doth by art in the Pans, and about the sticks, not hanging from the top, as in many other places I have seen it, like Ice-icles" (BROWN 1673).

Orpiment and *realgar* were interesting for alchemists as well, because of their supposed gold content. *Cinnabar*, as the bearer of the two *principia* (mercury and sulphur) was among the most studied minerals by alchemists. JOHANN LINDEMANN, a 17th century German alchemist, looked for *materia prima* (the "basic material" of gold) in Transylvanian cinnabar (SZATHMÁRY 1928). *Stibnite* is another mineral, widely used in alchemy. Hungarian stibnite (Antimonium hungaricum) was regarded the best available sort by many alchemists (e.g. BASILIUS VALENTINUS in his *Triumphal Chariot of Antimony*, or PARACELSUS, quoted by SZATHMÁRY 1928).

Ores of noble metals were of course better represented in the collection as compared with the *ores of base metals*. First of all, Hungary was still one of the most important European sources of gold and silver, and secondly, the collectors obviously preferred to visit gold and silver ore mines and to carry specimens of these noble metals from this remote country than other, less valuable ores. This is the case with *pyrite, marcasite and sulphur*, it is to be added that the production of these minerals was of only local importance this time (ZSÁMBOKI 1985).

The localities

Among the most important classical mining districts of Hungary (Lower Hungary, Upper Hungary, Avas-Gutin Mts, Transylvanian Ore Mts, Banat) the first one has overwhelming dominance if the distribution of the localities is concerned (Table 2). There may be several, but mutually related reasons of this fact. Not only the mining technology was the best developed there but the most prestigious mining towns were also those in Lower Hungary. The annual production of gold and silver is estimated to 500 kg and 25–30 t, respectively (ZSÁMBOKI 1985). Mining in Upper Hungary and in Avas-Gutin Mts. was in decline, and probabaly the localities were not so interesting. Habsburg rule extended only to the Kingdom of Hungary s. str. Most of the formerly occupied (central) part of Hungary was liberated from the Turkish rule in the last two decades the 17th century. This war and the uprisings (the largest being THÖKÖLY's uprising, 1678–1690 and RÁKÓCZI's insurrection, 1703–1711) considerably hindered mining. Wartime decades discouraged foreign travellers from a visit, especially to the eastern part of the country, which includes the mining districts of Upper Hungary, Avas-Gutin Mts and Transylvanian Ore Mts, the former partly, the latter entirely belonging to Transylvania, got under Habsburg rule only around 1690. The Banat remained under Turkish occupation until 1718.

Most of the specimens came from "*Schemnitz*, the greatest of the Mine-towns in *Hungary*: and where great quantity of Silver-ore is every day digged" (BROWN 1673). BROWN added, that "certainly there are few places in the World where Art and Nature strive to show their utmost force and riches". On the second place stands Neusohl: "at this Town, and near into it, are the greatest Copper-works in Hungary." (BROWN 1673). The proper locality of the specimens from Neusohl is Herrengrund, 8 km N from the town. Several specimens came from Kremnitz: "this is the oldest Mine-Town, and the richest in Gold of all the seven in these parts [Lower Hungary]." The small mining settlement Lupscherseiffen which has rarely been mentioned in foreign travellers' account also supplied four specimens (of stibnite).

* * *

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REFERENCES

AGRICOLA, G. (1546): *De natura fossilium libri X*. Modern German translation with remarks: PRESCHER, H. (ed.) (1958): *Georgius Agricola – Ausgewählte Werke, Band IV*. – VEB Deutscher Verlag der Wissenschaften, Berlin, 548 pp.

Allgemeine Deutsche Biographie. (1875–1912). – Leipzig, Duncker u. Humblot.

BASILIUS VALENTINUS (1604): *Triumph-Wagen Antimonii*. – Apels, Leipzig, 694 pp. A recent edition in English: Garland, New York, 1990, xliv + 189 pp., English text is also available at: http://www.levity.com/alchemy/antimony.html

BERTÓK, L. (1955): Köleséri Sámuel könyvhagyatéka. [Library estate of Sámuel Köleséri]. – *Könyv és Könyvtár* **3**: 5–330.

BROWN, E. (1670): An Accompt Given by Doctor Edward Brown, concerning the Copper-mine at Herrn-ground in Hungary. – *Philos. Trans.* **5** (59): 1042–1044 [correctly 1942–1944]. [Wrong page numbering; it is corrected, when page 1099 is followed by page 2000.]

BROWN, E. (1673): *A brief Account of some Travels in Hungaria, Styria, Bulgaria, Thessaly, Austria, Servia, Carynthia, Carniola, and Friuli*. – Tooke, London, 144 pp.

BROWN, E. (1687): *A brief Account of some Travels. The Second Edition with many Additions*. – Tooke, London, 222 pp.

BUTKOVIČ, Š. (1968): Po stopách výroby ortuti na Slovensku. [On the trails of mercury processing in Slovakia].– *Roc. Tech. múz. Košiciach*: 115–233.

COHEN, I. B. (1964): Newton, Isaac. – *In:* GILLISPIE, C. C. (ed.): *Dictionary of Scientific Biography 10*. Scribner, New York, pp. 42–101.

CSIBA, S. (1714): *Dissertatio historico-physica de montibus Hungariae*. – Roden, Tyrnaviae, 140 pp.

CSÍKY, G. (1992): Köleséri Sámuel. – *In:* NAGY, F. (ed.): *Magyarok a természettudomány és a technika történetében. Életrajzi lexikon A-tól Z-ig. [Hungarians in the history of science and technology. A biographical lexicon from A to Z.]* OMIKK, Budapest, pp. 290–291.

Dictionary of National Biography. Founded in 1822 by George Smith. Edited by Sir Leslie Stephen and Sir Sidney Lee. From the Earliest Times to 1900. – Oxford University Press, Oxford, vols. 1–65.

EYLES, V. A. (1965): John Woodward, F.R.S. (1665–1728) physician and geologist. – *Nature* **206** (4987): 868–870.

EYLES, V. A. (1971): John Woodward, F.R.S., F.R.C.P., M.D., (1665–1728): a bio-bibliographical account of his life and work. – *J. Soc. Bibliogr. Nat. Hist.* **5** (6): 399–427.

EYLES, V. A. (1976): Woodward, John. – *In:* GILLISPIE, C. C. (ed.): *Dictionary of Scientific Biography 14*. Scribner, New York, pp. 500–503.

FISCHER, W. (1943): 400 Jahre Sächsisches Oberbergamt Freiberg (1542–1942). Die Bedeutung dieser Dienststelle für die Entwicklung der Geologie und Lagerstättenkunde. – *Z. Dtsch. geol. Gesellsch.* **95**: 143–183.

GÖMÖRI, GY. (1989): Köleséri Sámuel levelei Sir Hans Sloane-hoz. [Letters of Sámuel Köleséri to Sir Hans Sloane.] – *Magyar Könyvszemle* **105** (3): 283–287. [In Hungarian; letters in Latin]

JAKÓ, ZS. (in press): *Köleséri Sámuel tudományos és irodalmi levelezése*. [Scientific and literary correspondence of Sámuel Köleséri.] – Szeged, Scriptum, 400 pp. [Hungarian, German, and Latin letters]

JÖCHER, CH. G. (1750): *Allgemeines Gelehrten Lexicon. Zweiter Theil, D-L*. – Duncker und Humblot, Leipzig, 2036 columns.

KÁZMÉR, M. (1997): Köleséri Sámuelnek szóló ajánlás J. J. Scheuchzer svájci orvos könyvében. (Une dédicace à Sámuel Köleséri dans le livre du médecin suisse J. J. Scheuchzer.) – *Magyar Könyvszemle* **113**(3): 318–320.

KÁZMÉR, M. (1998): Carpathian minerals in the eighteenth-century Woodwardian Collection, Cambridge. – *J. Hist. Collect.* **10** (2): 150–168.

KISS, L. (1988): *Földrajzi nevek etimológiai szótára. Negyedik, bővített és javított kiadás. I-II.* [Etymological Dictionary of Geographical Names. Fourth, extended and revised edition. I-II.] – Akadémiai Kiadó, Budapest, 821 + 822 pp.

KOBELL, F. VON (1864): *Geschichte der Mineralogie*. – Cotta, München, 703 pp.

KODĚRA, M. (ed.) (1986–1990): *Topografická mineralógia Slovenska. 1–3. (Topographical mineralogy of Slovakia. 1–3.)* – Veda, Bratislava, 1590 pp.

LAUDAN, R. (1987): *From Mineralogy to Geology*. – University of Chicago Press, Chicago, 278 pp.

LEVINE, J. M. (1991): *Dr. Woodward's Shield: History, Science, and Satire in Augustan England. 2nd ed.* – Cornell Univ. Press, Ithaca, 362 pp. [Originally published: University of California Press, Berkeley, 1977.]

LIPOLD, M. V. (1867): Der Bergbau von Schemnitz in Ungarn. – *Jahrb. k.k. Geol. Reichs-Anst.* **17**(3): 317–458.

LIPSZKY, J. (1808): *Repertorium locorum objectorumque in XII. tabulis Mappae regnorum Hungariae, Slavoniae, Croatiae, et Confiniorum Militarium Magni item Principatus Transylvaniae occurrentium, quas aeri incisas vulgavit Joannes Lipszky de Szedlicsna. I-II.* – Typis Regiae Universitatis Pestanae, Budae, 766 + 164 pp.

MAJTÁN, M. (1972): *Názvy obcí na Slovensku za ostatných dvesto rokov.* [Place names in Slovakia in the last two hundred years.] – Vydavatel'stvo Slovenskej akadémie vied, Bratislava, 667 pp.

MICHAUD, L. G. (1854–): *Biographie universelle ancienne et moderne.* – Letouzey, Paris, 50 vols.

PAPP, G. (1994): A magyarországi ásványgyűjtés rövid története. [Brief history of mineral collecting in Hungary.] – *In:* KECSKEMÉTI, T. & PAPP, G. (eds): *Földünk hazai kincsesházai. Tanulmányok a hazai földtudományi gyűjtemények történetéről. [Historical studies on the Collections of Hungarian Mineralogy, Geology and Paleontology.]* Hungarian Natural History Museum, Budapest, pp. 349–382.

PAPP, G. (1997): *A Kárpát-medence ásványlelőhelyeinek névtára. [Gazetteer of mineral localities of the Carpathian Basin.]* – Manuscript, Hungarian Natural History Museum.

PAPP, G., SZAKÁLL, S. & WEISZBURG, T. (1991): A brief history of the mineral and rock collections in Hungary. – *Ann. Hist. Hung. Geol., Special Issue* **3**: 15–26.

PARTINGTON, J. P. (1961): *A history of chemistry. Vol. II.* – Macmillan, London, 795 pp.

PILET, P. E. (1975): Scheuchzer, Johann Jakob. – *In:* GILLISPIE, C. C. (ed.): *Dictionary of Scientific Biography 12.* Scribner, New York, p. 159.

PANTÓ, D. (1935): Die Frage der Goldwascherei an der Donau. – *Földt. Közlöny* **65**: 182–274.

PRESCHER, H. (1955): Mineral-Register. – *In:* PRESCHER, H. (ed.): *Georgius Agricola Ausgewählte Werke, Band II.* VEB Deutscher Verlag der Wissenschaften, Berlin, pp. 247–255.

PORTER, R. (1977): *The Making of Geology: Earth Science in Britain 1660–1815.* – Cambridge University Press, Cambridge, 288 pp.

PORTER, R. (1979): John Woodward: 'A droll sort of philosopher'. – *Geol. Mag.* **116**(5): 335–343.

PRICE, D. (1989): John Woodward and a surviving British geological collection from the early eighteenth century. – *J. Hist. Coll.* **1**(1): 79–95.

RUDWICK, M. J. S. (1985): *The Meaning of Fossils. Episodes in the History of Palaeontology. 2nd ed.* – University of Chicago Press, Chicago, 287 pp.

RULAND, M. (1612): *Lexicon alchemiae sive Dictionarium alchemistorum.* – Francofurt. Reprinted in 1964, Olms, Hildesheim, 487 pp. [English translation by A. E. Waite, J. M. Watkins, London, 1964, 466 pp.]

SOÓS, I. & SZŐKEFALVY-NAGY, Z. (1967): Timsógyártás Magyarországon a XVIII. században. (Alum production in Hungary in the 18th century.) – *Techtört. Szle.* **4**: 123–134.

SZATHMÁRY, L. (1928): *Magyar alkémisták.* [Hungarian alchemists.] – Királyi Magyar Természettudományi Társulat, Budapest, 452 pp.

UZSOKI, A. (1985): Gold panning in the Carpathian Basin. – *In:* HÁLA, J. (ed): *Neogene mineral resources in the Carpathian Basin. Historical studies on their utilization.* Hungarian Geological Survey, Budapest, pp. 285–303.

VÖRÖS, I. (1983): Ifj. Köleséri Sámuel levele Scheuchzer zürichi professzorhoz. [Letter of Sámuel Köleséri, jr., to Professor Scheuchzer in Zürich.]. – *Irodtört. Közl.* **87**(5): 527–529.

WALLERIUS, J. G. (1750): *Mineralogie, oder Mineralreich.* (Transl. by DENSO, J. D.) – Nicolai, Berlin, 600 pp.

WEISZ, T. (1891): Der Bergbau in den siebenbürgischen Landestheilen. – *Jahrb. k. Ung. Geol. Anstalt* **9**: 105–184.

WILSON, W. E. (1994): The history of mineral collecting 1530–1799. – *Mineral. Rec.* **25**(6): 1–243.

WOODWARD, J. (1702): *An Essay Towards a Natural History of the Earth, and Terrestrial Bodies, Especially Minerals: As also of the Sea, Rivers, and Springs. With an Account of the Universal Deluge: And of the Effects that it had upon the Earth. The Second Edition.* – Printed by T. W. for Richard Wilkin, [London], 277 pp.

WOODWARD, D. J. (1728): *Fossils of all Kinds, Digested into a method, suitable to their mutual Relation and Affinity; with the names by which they were known.* – William Innys, London, 131 pp.

WOODWARD, J. (1729): *An Attempt Towards a Natural History of the Fossils of England; in a catalogue of the English Fossils in the Collection of J. Woodward.* – William Innys, London, 172 pp.

ZSÁMBOKI, L. (1985): The history of the mining of Neogene noble- and non-ferrous ores in Hungary. – *In:* HÁLA, J. (ed): *Neogene mineral resources in the Carpathian Basin. Historical studies on their utilization.* Hungarian Geological Survey, Budapest, pp. 261–283.

APPENDIX 1
List of Carpathian specimens in the Woodwardian collection

The list contains all Carpathian specimens in the Woodwardian Collection described in the catalogue (WOODWARD 1729). WOODWARD used an elaborate system to classify specimens in his collection. Also he listed English and foreign specimens in separate catalogues. As the collection grew, additional catalogues have been set up. A detailed description of catalogues is given by PRICE (1989).

This list of excerpts gives the titles of each catalogue, the titles of sections and subsections containing Carpathian mineral specimens and the relevant entries. WOODWARD's original usage of italics and brackets is preserved. We provide page numbers in small letters. The actual position of the specimens (e.g. {E-4–15}, where E is the cabinet of foreign specimens, 4 is the drawer number, and 15 is the specimen's number within the drawer) is given at the end of each entry, copied from PRICE's manuscript catalogues in Cambridge.

Translation of non-English texts and the correct version of locality names is given within angle brackets <...> in the entries. Notes of the authors follow the entries. Usually the mineralogical remarks stand first, followed by those concerning the specimen or the occurrence. Remarks concerning mineralogical terms occurring in multiple entries (e.g. fluores, marcasite etc.) are listed alphabetically in Appendix 2. Abbreviations: [E]: English, [G]: German, [L]: Latin. Locality names in the notes are the same (usually German) as used by WOODWARD, only with corrected spelling. The complete list of the Carpathian locality names together with their equivalents is given in Appendix 3.

WOODWARD (1729)

NHM: MIN Spec. Coll. 549 (CM) WOO

THOMAS PENNANT's copy

AN / ATTEMPT / Towards a / Natural History / OF THE / FOSSILS of England; / IN / A CATALOGUE of the *English* Fossils / in the Collection of / J. *Woodward*, M. D. / Containing / a description and historical account / of each; with Observations and Experiments, / made in order to discover, as well the Origin / and Nature of them, as their Medicinal, Mecha- / nical, and other Uses. / PART I. / Of the FOSSILS that are real and natural: / *Earths, Stone, Marble, Talcs, Coralloids, Spars, Crystals, Gemms, Bitumens, Salts, Marcasites*, / *Minerals, and Metals*. / TOME I. / LONDON: / Printed for F. Fayram, at the *Royal Exchange*; J. Senex, in / *Fleet-street*, and J. Osborn, and T. *Longman*, in Pater- / noster Row. M.DCC.XXIX.

Price's Catalogue I: Foreign native (in Vol. 2)

A Catalogue of the foreign Fossils in the collection of J. Woodward M. D.

Brought as well from several Parts of *Asia, Africa*, and *America;* as from *Sweden, Germany, Hungary*, and other Parts of *Europe*.

With a Characteristick Description, and Historical Account of each; as also various experiments, observations, and reflections, in order to the setting forth the Natural History, and the Medicinal, Mechanical, and other Uses of them.

PART. I. Exhibiting the Fossils that are real, and natural, Earths, Stones, Marbles, Talcs, Coralloids, Spars, Crystals, Gems, Bitumens, Salts, Marcasites, Minerals, and Metals.

p. 2.

Terrae & Terris Affinia.
Earths, and Earthy Substances.

α.34. *Berg-Grün Germanis*, i.e. Mineral-Green. The Water That proceeds thorough the Drains forth of the Copper-Mines, near *Newsol* <Neusohl>, in *Hungary*, abounds in Vitriol. This they frequently separate and crystallize, by putting Iron into the water: and after the Vitriol is crystalliz'd, this *Berg-Grün* settles to the Bottom of the Vessels. *Mr. Weber*. this appears to be little different from the common Terre Verte. {E-1–20}

An earthy piece, 1 cm in size.
Berg-Grün [*Berggrün*, G], literally 'mountain green': a collective term to green, massive or earthy secondary copper minerals, usually malachite, pseudomalachite or chrysocolla. *Terre verte*, literally 'green earth' in French, usually refers to earthy clay minerals containing divalent iron like glauconite or celadonite. Mountain green is mentioned by BROWN (1673) from this locality: "there is also a green Earth or Sediment of a green Water, called *Berg-Grun*, used by the Painters." The production of this material near Neusohl was already reported by AGRICOLA (1546).

p. 5.

Talcum Fibrosum
§1. *The fibrous talky Bodies.*

ζ.6. *Amianthus Hungaricus* <Hungarian amiant>. *Stein Flacks*, i.e. Stone Flax. M. *de Schonberg*. [It lies in small Veins, generally in the Iron Mines. Mr. *Weber*.] {E-5–31}

Amianthus [L], amiant: a collective term to fibrous, asbestiform minerals, usually serpentine or amphibole asbestos, rarely fibrous sulphates, e.g. halotrichite or alunogen.

p. 10.

Crystalli & Fluores
Incrustations, Stalactitae, Stalagmitae, Crystals, and Spars.

λ.1. A sparry Incrustation, made by the Water of the Baths of *Eisenback* <Eisenbach>, near *Schemnitz*, in *Hungary*, upon the wooden Planks on the Sides of the Baths. It grows so fast, that they are constrain'd to change and renew the Planks' yearly. {E-4–13}

Finely laminated calcareous precipitate.
The specimen may have been presented by BROWN. According to his book "*Eisenbach* (...) hath also hot Baths; the Sediment of which is red, and turneth into stone; so that I brought away with me pieces of it of five or six inches diameter: I took also a large piece of this water petrified as it fell from a spout in which the waves of it are to be seen".

λ.3. An Incrustation, out of the Pipes that convey the Water into the Baths of *Buda*, brought thence Dr. *E. Brown*. {E-4–15}

Dark brown, botryoidal encrustation.
BROWN (1687) visited eight baths and described incrustations from two of them: In the "Bath of the green Pillars" (now Rudas bath) "the water ... is impregnated with a petrefying Juyce, which discovers it self on the sides of the *Bath*, upon the Spouts, and other places, and makes a grey Stone. The exhalation from the Bath reverberated by the *Cupola*, by the Irons extended from one Column to another, and by the Capitals of the Pillars forms long Stones like *Isicles*, which hang to all these places." The water of the "Bath of Velibey" (now Császár bath) "hath a strong sulphureous smell, and a petrefying Juyce in it".

λ.4. White Spar, from the Sweating-Bath at *Glassiten* <Glashütte> in Hungary. Dr. BROWN. {E-4–16}

White, massive, calcareous encrustation.
According to BROWN (1673) "the Springs are very clear, the Sediment is red and green, the wood and seats of the Baths under water are incrustated with a stony substance, and silver is gilded by being left in them (...) the sides of the Bath are also covered by the continual dropping of those hot Springs, with a red, white, and green substance, very fair and pleasing to the eye."

p. 14.

Appendix I.
Crystals and Spars tinged with various Colours, by means of metallick and mineral Matter that is incorporated with them.

p. 17.

Lapides Venarum; seu materia lapidea varia in Venis Metallicis alijsque stratorum Saxeorum Fissuris, reperta.
VEIN-STONES.
Sales, *salts*.

ν.13. *Vitriolum nativum album striatum* <Striated native white vitriol>. From the Gold Mine of *Cremnitz* <Kremnitz> in *Hungary*. 'Tis found along with the striated Antimony and the Gold-Ore, about 300 Fathom deep. 'Tis very white when first taken forth: and the Striae, or rather Threads, run a-cross the Veins. {E-8–13}

Light, fibrous substance.
White vitriol is generally regarded as a synonym of goslarite, $ZnSO_4.7H_2O$. However, it may refer to melanterite, $FeSO_4.7H_2O$, cf. RULAND (1612). There is only one reference to goslarite but many to melanterite at Kremnitz (KODERA 1990). Cf. BROWN (1673): "there is Vitriol in this Mine, white, red, blue and green; and also Vitriolat waters."

v.14. *Vitriolum nativum album striatum, viridi leviter tinctum. Ex fodina Schemnitz. Hungariae* <Striated native white vitriol, slightly tinted to green. From the Schemnitz mine in Hungary>. *M. Oliv. du Mont.*

PRICE's notice: Missing 1750. Should be placed between E-8–13 and E-8–14.
Probably melanterite.

v.16. *Vitriolum nativum viride. Ex Aurifodinis Hungariae juxta Cremnitz* <Native green vitriol. From the Hungarian gold mines near Kremnitz>. 'Tis found thus in great Quantities in the Veins: sometimes shot into angular Figures: and frequently hanging down in Form of Stalactitae. This vitriol, that is green, is only found in those Veins where the Ore has in it Iron together with the Gold. Whereas the native white Vitriol of the Gold-Mines near *Cremnitz* <Kremnitz>, is found only in those Veins that contain no other Metal besides Gold. In the Copper-Mines of *Neijsol* <Neusohl> in *Hungary*, in the Veins along with the Copper-ore is found blue Vitriol in Form like this: and sometimes shot into angulated Figures, and into Stalactitae; both of a fine Sapharine blue Colour. {E-8–15}

Pulverulent, earthy substance.
Green vitriol is melanterite, $FeSO_4.7H_2O$, blue vitriol is chalcanthite, $CuSO_4.7H_2O$.

v.17. The Stone on which the natural Vitriol shoots in the Mines of *Schemnitz* in *Hungary*. Dr. *Edward Brown*. 'Tis of a dusky Grey Colour, and has in some Parts, green Vitriol, in others a yellow sulphureous Efflorescence concreted upon it. {E-8–16}

See page 14 of this paper for BROWN's description of a locality of vitriol at Schemnitz.

v.18. Native green Vitriol out of the Silver-Mine of *Schemnitz* in *Hungary*. Dr. *Edward Brown*. {E-8–17}

See remark under v.16.

p. 20.

Mineralia Metallis affinia, *Metallick Minerals*.
Sect. 1. *Cinnabaris*, seu *Minium verum nativum*. Cinnabar.

o.4. *Vena Cinnabaris, cum fluore astro-rubente. Ex Hungaria*. <Cinnabar ore with dark red spars. From Hungary.> *M. de Schonberg*. {E-9–1}

o.5. *Cinnabaris Hungarica.* Zinnober-Ertz. <Hungarian cinnabar. Cinnabar ore.> *M. de Schonberg.* {E-9–5}

o.6. *Anthrax, sive Vena Minnij Schemnicensis Hungarica, cum Fluore & Marcasit juncta.* <Anthrax, or minium ore, Schemnitz, Hungary, closely associated with spars and marcasite.> Dr. *Leopold.* There is also in this Mass, Lead-Ore holding a little Silver. About *Rosenburg* in *Hungary*, is the most considerable Tract of all *Europe* for Cinnabar. It is found upon the Sides of great Hills. The poor people collect it after Rains, which clear and uncover it. It lies chiefly in a whitish sparry Stone: and sometimes in Sand-Stone. At *Bartfeld*, and *Seben* in Upper Hungary, they sink Mines for Silver and Cinnabar. They are incorporated in the same Mass: and lie in Bellies, but run likewise into Strings. {E-9–6}

Anthrax [G]: Although in the antiquity it usually referred to a red precious stone (carbuncle), ruby or red spinel, this term was also used for red, massive cinnabar (AGRICOLA, 1546); *vena minii* [L], literally 'minium ore' is also cinnabar (PRESCHER, 1955). *Marcasit*: see Appendix 2. Rosenburg is obviously a misprint for Rosenau (Rozsnyó, now Rožňava). Large mercury deposits were mined 10 km NW from this town at Nižná Slaná (former Unterslana or Alsósajó) (BUTKOVIČ, 1968). The "whitish sparry Stone" accompanying the cinnabar of that locality is obviously barite.

There is no data available for the mining of silver or mercury in the surroundings of Bartfeld (Bártfa, now Bardejov) and "Seben" (Kisszeben, now Sabinov), both in Slovakia.

o.8. *Minium nativum. Aurum continens, cum fluore* mixtum. Ex vena trium Regum *Fodini Schemnicensis in Hungaria.* <Native minium. It contains gold and is mixed with spars. From the vein of the three Kings of the Schemnitz mines in Hungary.> {E-9–8}

Minium nativum [L]: Cinnabar (PRESCHER, 1955). The mine "called the three Kings" was reported by BROWN as an important one. The Three Kings' Vein is located some 9 km WNW from Schemnitz, near Vyhne.

o.9. A Body compos'd chiefly of white Spar, but having some Cinnabar, and marcasite, along with it. Upon Trial, besides Mercury, it yields some Silver: and is a sort of Rotgulden-Ertz. Brought from *Hungary* by *M. Ol. du Mont.* {E-9–9}

o.10. *Cinnaberis atro-fusca cum scintillis passim micantibus.* <Dark brown cinnabar with scattered glittering specks.> Out of the Silver-Mine at *Schemnitz.* The Silver-Ore is found in Veins: and this Cinnabar along with it. This holds some Silver in it, and a little Gold. It has little Quick-Silver in it, so that they rarely extract that. {E-9–10}

o.11. Rotgulden Ertz. Brought from *Hungary* by *M. Ol. du Mont.* {E-9–11}

Rotgulden-Ertz [*Rotguldenerz*, or *Rotgültigerz*, G] is an old German miners' term for red silver ore, i.e. proustite, Ag_3AsS_3, or pyrargirite, Ag_3SbS_3. It should have been listed with the silver minerals. A passage of BROWN (1673) may also refer to this mineral: "there [in the Windschacht mine at Schemnitz] is often found a red substance which grows to the Ore called *Cinnaber* of Silver, which being grinded with Oyl maketh a Vermillion equal to, if not surpassing the *Cinnaber* made by sublimation."

o.18. Cinnabar. Out of a River in *Hungary*. Sir *Isaac Newton*. {E-9–18}

Tiny, rounded pebbles.
Cinnabar was often washed from alluvial deposits due to its high density.

p. 21.

Sect. 2. Arsenium. *Arsenick*

[x]o.3. *Auripigmentum*. Native yellow Arsenick, with Veins of red Arsenick, and glossy Talc-like flakes; found near *Newsohl* <Neusohl>, in *Hungary*, in great Quantity. They dig up Pieces as fine, and some finer than this of two and three hundred Pound Weight. 'Tis soft like *Castile* soap when first dug up. It lies in Masses in Clay. The Flores of this being melted, become transparent, and of a fine red Colour. There is nothing else got in these Pits; nor is it usually found in any of the Mines of Metal in *Hungary* or *Saxony*. 'Tis found from 10 to 30 Fathom deep. {E-8–54}

Auripigmentum [L]: orpiment. The locality "near Newsohl" is Tajov (formerly Tajova or Tajó), 6 km NWN from the town, where orpiment was mined already in the Middle Ages.

[x]o.4. Orpiment, small, in form of Powder, otherwise not different from the precedent. 'Tis found in the same place with that: and generally above it; being mingled with Clay in the Strata, from which 'tis parted by washing. {E-8–55}

[x]o.10. *Arsenick*; held to the Fire it liquates, and emits Fumes partly arsenical, and partly sulphureous: *Hungary*. This is native; and what *Agricola* and the other *German* Mineralists call the red Arsenick. And it is of a Colour much deeper than that of common Orpiment tho'not red; but of a yellow very high, with a Cast of red. Dr. *Edward Brown*.

Arsenick [E], red arsenic: realgar.
A specimen, not clearly identifiable with any of the above, is mentioned in WOODWARD (1728, pp. 41–42) as "Native-Red-Arsenick", followed by his footnote (4): "Arsenicum rubrum nativum... The Hungarian Sandarache is of an Orange Colour: But that from East India a deeper red. I have samples of each; but both are very rare"

p. 22.

Sect. 3. *Sulphur*

[*]o.1. Native sulphur brown, dug up thus in Lumps at _____ in *Hungary*. {E-9–26}

Ore. Dashed in the manuscript catalogue: was probably illegible to WOODWARD.

[*]o.2. Native sulphur brown, dug up near the Gold-Mines in *Hungary*. {E-9–27}
[*]o.3. Another sort, with a Cast of Lemon-colour; from the same Place. {E-9–28}
[*]o.9. Native sulphur of a Lemon-colour, and was very fine; found in Nodules in the Gold-Mine in Hungary. {E-9–34}

Pyrite crystal bearing three, finely striated dodecahedron faces.

p. 25.

.+.o.9. *Pyrites Hungariae communis.* <Common pyrites from Hungary.> Brought thence by M. Ol. du Mont. {E-10–9}

Pyrites see Appendix 2.

.+.o.16. *Kis*, a marcasite brought from *Hungary.* by *Ol. du Mont.* [Upon tryal this yielded only a very inconsiderable proportion of of copper and lead; but no silver or gold.] {E-10–16}

Kis [*Kies*, G]: an old German miners' term. Originally it was applied to quartz, then to other barren materials, first of all pyrite and marcasite, see Appendix 2.

Sect. 8. Antimonium. *Antimony.*

p. 27.

‡.o.2. *Antimonium nativum griseum, cum Scintillis spississimis, Hungaricum.* <Hungarian native grey antimony, with dense glittering specks.> From *Leibschersuffen* <Lupscherseiffen>. Found in Veins among Copper and Iron-Ore, in the Day downwards, in great Quantity. {E-10–55}

Antimonium nativum [L], literally 'native antimony': (here) stibnite.

‡o.4. *Minera Antimonij, à Leibschersuffen in Hungaria.* <Antimony ore from Lupscherseiffen in Hungary.> {E-10–57}

‡o.5. *Minera Antimonij Hungarica à Leibschersuffen.* <Hungarian antimony ore from Lupscherseiffen.> It is flat, having a thin Plate of a pale brown Spar, on each of the two opposite Sides: and appears to have been taken forth of a Vein. There is with it a considerable Mixture of Sulphur, yellow with a cast of Green. {E-10–58}

Radial, fibrous antimonite in host rock.

‡o.8. *Antimonium Hungaricum crystallizatum in Terra lutea.* <Crystallized Hungarian antimony in yellow earth.> Dr. *Scheuchzer.* {E-10–61}

Antimonium Hungaricum [L]: stibnite. *Terra lutea* [L], literally 'yellow earth': probably yellow antimony ochre.

‡o.9. *Minera Antimonij Hungarica.* <Hungarian antimony ore.> Spies-Glas; *i.e.* Spear-Glass, or Antimony. M. *de Schonberg.* [It is found in Quantity in the Gold-Mines of *Cremnitz* <Kremnitz> in Veins, 300 or 400 fathom deep. Mr. *Weber.*] {E-10–62}

Spies-Glas [*Spiessglas*, G], literally 'spear-glass': an old German miners' term for stibnite.

p. 28.

‡o.14. Minera Antimonij Hungarica, stellaris, & pulchrè striata: cum fluore etiam striato. <Hungarian antimony ore, radial and beautifully striated, with spars, also striated.> Dr. *Kisner.* à Leibschersuffen. <From Lupscherseiffen> {E-10–67}

Radial stibnite.

p. 30.

Auri Minerae, *Gold-Ores*

π.3. Sand, so very fine, as to be almost impalpable, of a very dark grey Colour; but shining and glittering, not much unlike the Filings of Steel. Being view'd with a Microscope, there appear in it numerous small Grains of Gold, shining, and of a yellow Colour: and indeed some of them are so large as to be discern'd by the naked Eye. This was found on the Shores of the *Danube*, between *Presburgh* <Pressburg> and *Comorrah* <Komorn> in *Hungary.* The People that collect, wash, and dress it, find the greatest Quantities of it after great Rains, and melting of the Snow upon the Mountains, about *Cremnitz* <Kremnitz>, where the Gold-Mines* are. The Rain, and Snow-Water, falls down from those Mountains, by the *Waag, Neytra* <Neutra>, *Gran*, and other Rivers, with so great rapidity, as not to suffer the Gold-Dust to settle and precipitate in them, nor till 'tis brought to the *Danube.* {E-11–24}

*WOODWARD's footnote: See Dr. Edward Brown's *Account of them, in his Travels*, p. 62 & seq.

The gold content of the alluvial sediments of the Danube upriver from *Comorrah* is derived from the Alps (PANTÓ 1935). The rivers *Waag* and *Gran* also carry gold-bearing sediments (UZSOKI 1985), but they reach the Danube at, and below *Comorrah*, respectively.

π.5. *Aurum purum Fossile ex Hungaria.* <Pure dug gold from Hungary.> Dr. *Scheuchzer.* {E-11–25}

π.8. Dust-Gold. From the River _____ in Hungary. Mr. *Chishull.* {E-11–29}

Dashed in the manuscript catalogue: was probably illegible to WOODWARD. Gold washing was carried on along many of the rivers of the former Hungary including Transylvania (see UZSOKI 1985).

π.9. Virgin-Gold, very fine, only wash'd. Out of the Vein of a Mine near *Hermanstad*, <Hermannstadt> [Cibinium] in *Hungary.* Mr. *Chishull.* {E-11–30}

Gold nuggets, platelets up to 5 mm in length.
There was no gold mine near Hermannstadt, but the specimen may have been one of those got by CHISHULL (q.v.) not far from that town.

p. 31.

π.10. A grey Stone, part of the Side of a vein, with Spar adhering to it: as also Gold, yellow, and fine. From the same Vein. {E-11–34}

π.13. *Minera auri, cum admixta Particula Cinnaberis nativae. Ex fodinis Cremnizensibus, Hungariae.* <Gold ore with admixed native cinnabar particles. From the Kremnitz mines, Hungary.> Dr. *Leopold.* {E-11–34}

Argenti Minerae, *Silver-Ores*

PRICE's 'The Woodwardian Collection 2' catalogue ends here.
PRICE's 'The Woodwardian Collection 3' catalogue starts here.

p. 32.

ρ.5. *Argentum nativum capillare Hungaricum.* <Capillary native silver, Hungary.> *Schemnitz.* Dr. *Leopold.* {E-11–43}

ρ.6. *Argentum rude purpureum Hungariae.* <Native purple silver from Hungary.> *Schemnitz.* Dr. *Leopold.* This is very rich. {E-11–44}

Argentum rude purpureum [L] of Schemnitz is most probably dark red silver ore, i.e. pyrargyrite, although this term may also refer to kerargyrite (Cf. notes to AGRICOLA 1546).

p. 33.

ρ.21. *Minera Argenti ex fodinis Altsolensibus in Hungaria.* Rotgulden-Ertz. <Silver ore from the Altsohl mines in Hungary. Red silver ore.> Dr. *Leopold.* There is Spar and Marcasite with it. {E-11–59}

There were no mines in the surroundings of Altsohl. The locality was possibly confused with Neusohl.

p. 34.

ρ.34. *Argentum rude rubrum mixtum cum Marcasita, Schemnicense Hungaricum.* <Native purple silver mixed with marcasite, Schemnitz, Hungary.> Dr. *Leopold.* {E-11–72}

See remark to ρ.6.

ρ.35. *Minera Argenti purissima, ex fodinis Schemnicensibus in Hungaria.* <The purest silver ore from the Schemnitz mines in Hungary.> Dr. *Leopold.* There is Spar and Marcasite with it. {E-11–73}

ρ.38. *Argentum rude nigrum Schemnicense Hungaricum.* <Native black silver, from Schemnitz in Hungary.> Dr. *Leopold.* It yields about Silver. {E-11–76}

Argentum rude nigrum [L] corresponds to stephanite (cf. notes to AGRICOLA 1546).

p. 36.

ρ.54. *Argentum rude plumbej coloris.* Glass-Ertz Agricolae. Ex fodinis Hungariae. <Native lead-coloured silver. Glass ore of Agricola. From the Hungarian mines.> Dr. *Scheuchzer.* {E-12–16}

Argentum rude plumbei coloris [L], *Glass-Ertz* [*Glaserz*, G] corresponds to acanthite (cf. notes to AGRICOLA 1546).

ρ.56. *Argentum rude ex Hungaria*, Glass-Ertz. <Native silver ore from Hungary. Glass ore.> M. *de Schonberg.* ['Tis rich and found in Quantity in Veins at *Schemnitz.* Mr. *Weber.*] The Glass-Ertz is always very rich in Silver. The Characteristick of it is, that it cuts with a Knife like melted Lead. That on the Top is the Glass-Ertz; the rest is Bleyglantz, or common Lead-Ore. {E-12–18}

See remark to σ.54. *Bleyglantz* [*Bleiglanz*, G] is lead glance (galena).

σ.64. Silver ore out of the Silver-Mine of *Schemnitz* in *Hungary.* Dr. *Edward Brown.* {E-12–26}

p. 37.

σ.74. *Vena Argenti ex fodina Trium Regum sanctorum Schemnizensi, in Hungaria.* <Silver ore from the Three Holy King Mine at Schemnitz in Hungary.> Dr. Leopold. {E-12–36}

See remark to o.8.

Plumbi Minerae, *Lead-Ores.*

p. 40.

σ.40. A Nodule of Lead from a Mine at ____ in *Hungary.* M. *Ol. du Mont.* He had several other like Nodules from the same mine. {E-13–6}

Dashed in the manuscript catalogue. The specimen is a pebble.

PRICE's catalogue has a mistake here: the *Hungary* is written one line higher, in the row of σ.39 = E-13–5.

p. 43.

v.35. A Marcasite, yellow, with a glossy Grey, and Purple in some Parts, holding Copper. From the Mines of *Newsohl* <Neusohl> in *Hungary*. {E-14–5}

p. 44.

v.48. A Marcasite, yellow, with a glossy Grey, and Purple in some Parts, holding Copper. From the Mines of Newsohl <Neusohl> in Hungary. {E-14–8}

Although v.35. and v.48. has identical description – in the manuscript catalogue, too – the two specimens are not identical, neither they are derived from the same rock.

"Marcasite (..) holding Copper" is obviously chalcopyrite.

p. 47.

APPENDIX

Mantissa IV.
Fossilium quorundam Praeparationes.
Miscellany Instances of Metallick and Mineral Bodies, that have been wrought; and that give some light to Natural History

p. 50.

$^{x}\omega.22$. This was given me by Dr. Ed. Brown; and is what he in his Travels, pag. — calls *iron turn'd into Copper*; from a Spring near the Copper-Mines of *Hern-Grunt* <Herrengrund> in *Hungary*. The Brief of this Transaction is, these Springs, Rivulets, *&c.* that arise out of the Copper-Mines here, are impregnated with much Vitriol; in which there is also Copper dissolv'd. Indeed the Vitriol constitutes a kind of Menstruum. Upon the putting Iron in, that Menstruum preys upon it, and assumes the ferreous Parts into itself. At the same time it precipitates an equal proportion of the cupreous Parts; a thing common and well understood by Refiners, and all who have been conversant with Solutions in *Aqua Fortis* <here: sulphuric acid>, and other like *Menstrua* <solvents>. {E-16–30}

Dashed in the manuscript catalogue. It is p. 109 in BROWN (1673). The specimen is a copper crust precipitated on iron. See under 5.1

pp. 50–51.

$^{x}\omega.23$. Copper, very fine; and concreted in a very elegant and observable manner. 'Tis in form of the Letter B; and was form'd, in the manner recited in the precedent, upon the putting a Piece of Iron of the very same Figure and Dimensions into a Vitriolick Spring in *Hungary*. M. *Ol. du Mont*. {E-16–31}

At Herrengrund different souvenirs were made using vitriolic water. BROWN (1673) received "a piece of Copper of the Figure of a Heart which had been layed in it [vitriolic water] eleven or twelve days before; having the same Figure, but as perfectly Iron then, as it is at this day Copper."

p. 51.

^{x}ω.24. *Ferrum in cuprum mutatum in Fonte Neosolensi in Hungaria.* <Iron turned into copper in a spring at Neusohl in Hungary.> Dr. *Leopold.* {E-16–32}

^{x}ω.25. A Piece of Copper in shape of a Piece if Iron, that was put into some Rivulet near *Herngrunt* <Herrengrund>. M. *Ol. du Mont.* {E-16–33}

^{x}ω.25. and ^{x}ω.26. both are copper crusts precipitated on a piece of iron rod of square cross-section.

^{x}ω.26. *Caementum.* N.B. *Caementum sua natura ferrum est, virtute vero Aquae vivae, quae prope Civitatem Eperies in Hungaria oritur, brevi temporis Spatio in Cuprum mutatur.* M. *de Schonberg.* <Cement. N.B. Cement, iron by its inherent nature, but thanks to the natural water, which rises near the town Eperjes in Hungary, in a short time changed into copper.> (The same is done in a Rill of greenish Vitriolick Water at Isol <Neusohl>, five miles from Schemnitz. The Copper precipitates exactly in the very Form of the Piece of Iron, in 1, 2, 3, to 6 Months, according to the Thickness of the Iron. Mr. *Weber.*) {E-16–34}

There is no data of cement copper around this town. The only well-known locality of precipitated copper in Upper Hungary was Schmöllnitz or Szomolnok, now Smolník.

^{x}ω.27. *Lamina ferrea in Cuprum transmutata.* <Iron plate changed into copper.> Spener Mus. p. 162. Ex Hungaria. <From Hungary> Dr. Leopold. {E-16–35}

The quoted book is *Joh. Jac. Speneri Museum, latine & germanice consignatum a Joh. Mart. Michaelis*, Leipzig; 8vo.

* * *

A / CATALOGUE / OF THE / FOREIGN FOSSILS / In the COLLECTION of / J. *WOODWARD* M.D.

Brought as well from several parts of *Asia, Africa*, and *America*, as from *Sweden, Germany*, and *Hungary,* and other parts of *Europe.*

PART. II.

PRICE's Catalogue K (Foreign Extraneous) in the volume 'Woodwardian Collection 3, pp. 11–

Exhibiting the Fossils that are extraneous; the Parts of Vegetables, and of Animals, digged up out of the Bowels of the Earth; in particular the Shells of Sea-Fishes; as also the Stoney, Mineral, and Metallick Bodies form'd in them.

Ranged and disposed in a Classical Method, according to their several Kinds and Alliances; with an Historical Account of each; as likewise various Observations and Reflections.

10 July 1725.

p. 1.

Vegetable bodies dug up out of the Earth.
Parts of Trees and Shrubs found buried under Ground.

α.13. A piece of Wood dug up out of the Alum-Mines near *Duben* in *Hungary*. Sent by Dr. *Kisner*, of *Francfort*. <Frankfurt> {E-18–35}

Piece of wood. Unusually light piece, not necessarily fossil – or saturated by alum only?

This specimen probably hasn't come from Hungary. We are unable to identify Duben with any Hungarian locality, and according to SOÓS & SZŐKEFALVY-NAGY (1967) alum production in Hungary began only around 1760 and before this date the alum demands were satisfied by import from Italy.

p. 10.

Anomiae

δ.85. Another, dug up at the Depth of 50 fathom in an Iron-Mine, about 20 Miles from Newsohl <Neusohl>, Hungary. Mr. Weber. {E-22–24}

A small rhynchonellid brachiopod. It is the first invertebrate fossil published from Hungary.

p. 28.

Bones, Teeth, &c of Fishes

μ.154. A small piece of Bone, having its Surface of a green Colour, and its interior Parts of a blue; broke off from a much larger. That is throughout the same Colour. It seems to be part of the scutellated Bone of a Sturgeon; being flat, of a porous or cellular Constitution on one side, tho' the Cells be somewhat worn down, and flatted; and smooth on the other. 'Tis about 1/10 of an Inch in thickness, 3 Inches long, and 1 Inch and broad. Taken up near *Herngrundt* <Herrengrund> in *Hungary*; colour'd by the Water of the rich Copper-Mines. Given me by Dr. *Edward Brown*, President of the College of Physicians. Those bodies that the Jewellers call *Turcois-Stones*, are no other than Pieces of Bones tinged blue by the Copper-Ore, amongst which they were lodg'd. These they cut, polish, and set in Rings. And indeed the same learned Gentleman, in his Travels, p. 68. informs us, that in those very Copper-Mines of *Herngrundt, are stones found of a beautiful green and blue Colour; and one sort upon which Turcoises have been found, and therefore call'd the Mother of the Turcois*. By this I am the better enabled to apprehend an obscure Passage in *P. Poterius's Pharm. Spagyr.* l. 2. c. 25. where he says, that in the Cabinet of *S. Cassiani del Pozzo* at *Rome*, he saw "Turcois-Stones made of Ebur-Fossile, exactly like the true natural Turcoises, agreeing with them in all respects, in Colour, in Hardness, and in Virtues." {E-27–63}

WOODWARD's footnote: "Turchesios lapides, ex dicto Ebores factos veris, & naturalibus Turchinis Gemmis simillimos, atque in omnibus convenientes, Colore, Duritie, & Virtute praestantes." The quoted book is POTIER (or POTERIUS), P. (1622): *Pharmacopoea spagyrica, nova et inaudita.* Bononia.

PRICE's notice: Only a small fragment remains.

One of the authors (M.K.) found a 4 mm wide, 7 mm long, 1 mm thick piece. An account of the locality is given in BROWN (1670).

* * *

PRICE's Catalogue L (Add^{n} Foreign Native) in 'Woodwardian Collection 3', pp. 24–

AN / ADDITION / TO THE / CATALOGUE / OF THE / Foreign Native Fossils, / In the COLLECTION of / J. WOODWARD M.D. /

Preface: Aug. 23. 1725

p. 2.

Terrae, & Terris Affinia.

α.33. *Viride montanum Hungaricum, s. Crysocolla.* <Hungarian mountain green, or chrysocolla.> From *Newsohl* <Neusohl> in *Hungary*. D. *Linck*. It appears to me to be a preparation, and not in its native Condition. {E-1–21}

Earthy, layered substance.
See remark to Vol. II. Part. I. α.34.

p. 7.

Appendix 3.
Pumex, Lapis spongiae.

θ.8. *Asbestos, ex Hungaria.* <Asbestos, from Hungary.> Dr. Breynius. {E-18–29}

There is a fossil leaf from Oeningen, Switzerland, in the drawer, bearing this number.
Asbestos [L]: the same as *Amianthus*, q.v.

Ludus Helmontii.

ι.1. *Ludus Helmontij*, with ferruginous septa. Hungary. Dr. *Ed. Brown*. {E-3–52}

Beautiful septarian concretion. *Ludus Helmontii* [L]: HELMONT's toy. Named after JOHANN BAPTIST VAN HELMONT (1579–1644), a Dutch alchemist.

p. 13.

Sales

ξ.7. *Vitriolum album nativum Schemnicense, Hungaricum.* <Native white vitriol, Schemnitz, Hungary.> Dr. *Leopold.* {E-8–28}

White vitriol is generally regarded as a synonym of goslarite, $ZnSO_4.7H_2O$. However, it may refer to melanterite, $FeSO_4.7H_2O$, cf. RULAND (1612). Both minerals are known from Schemnitz.

Cinnabaris

p. 14.

o.12. Native Cinnabar. Hungary. M. *Sam. Robeseri* <Köleséri>. {E-9–24}

p. 15.

Antimonium

π.27. Native antimony, cover'd with a brownish Crust, after the manner of that of Cornwall. Mr. Sam. Robeseri <Köleséri>. This is from Hungary.

Native antimony here corresponds to stibnite.

Dendritae f.
Fossilia Artis ope redacta

p. 21.

ω.6. *Charta, ex Asbesto Lapida Hungarico facta.* <Paper made from Hungarian asbestos stone.> Dr. *Breyn.* {E-16–43}

PRICE's notice: Missing?

KÁZMÉR's notice: At the location E-16–43 I found a piece of paper, almost illegible. The number ψ.43. could be read. Probably it is BREYN's notice, and another hand – WOODWARD? – wrote the words 'Hungarico' and 'J. B. Breynii' on it. PRICE considered this piece of paper as the label of a missing specimen, but this is the specimen itself: a piece of asbestos paper. In WOODWARD's time the most important and well known occurrence of chrysotile asbestos was Dobschau or Dobsina (now Dobšiná in Slovakia). CSIBA (1714) remarked that during RÁKÓCZI's War of Independence (1703–1711) a foreigner made fabric and paper from the asbestos collected at this locality.

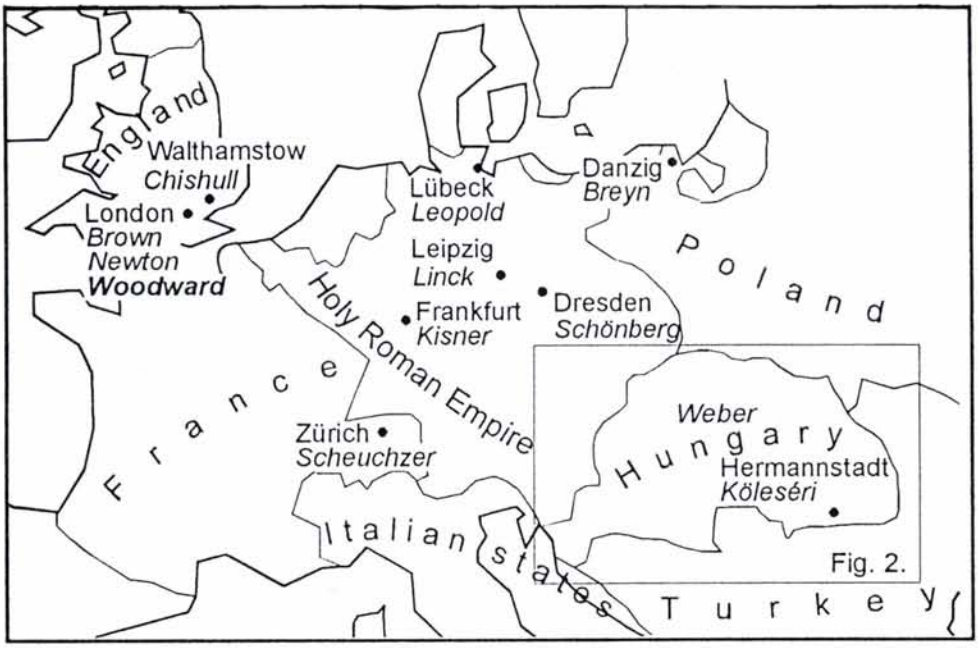

Fig. 1. Map of early 18th century Europe. Collectors (names in *italics*) resident in these cities have sent Carpathian mineral specimens to WOODWARD in London.

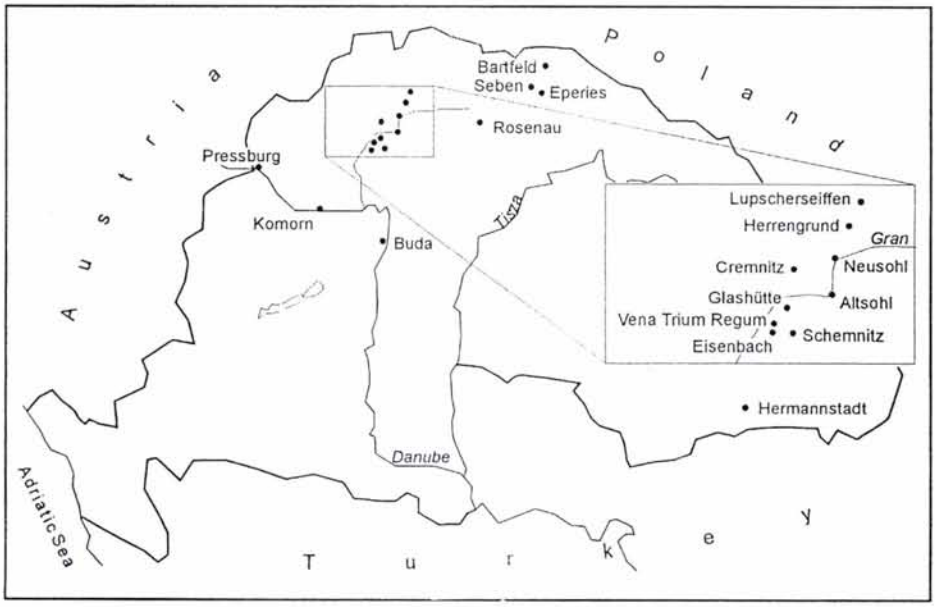

Fig. 2. Carpathian mineral localities mentioned by WOODWARD (1729) drawn on an early 18th century political background. Names follow WOODWARD's usage with corrected spelling. See Appendix 3 for current usage of names.

APPENDIX 2
Notes on some mineralogical terms occurring in several entries

Fluores [L]: a group of minerals resembling to gems, but of less hardness (cf. RULAND 1612). WOODWARD uses spars as English equivalent of the Latin term.

Marcasite [E]: in WOODWARD's time marcasite and pyrite terms were usually regarded as equivalents and the same as the German *Kies*, a collective term for different sulphides, first of all marcasite, pyrite, pyrrhotite, arsenopyrite and chalcopyrite (cf. RULAND 1612; AGRICOLA 1546; PRESCHER 1955).

Pyrites [L]: see Marcasite

Rotgulden-Ertz [*Rotguldenerz* or *Rotgültigerz*, G] is an old German miners' term for red silver ore, i.e. proustite or pyrargirite.

Spars [E]: see *Fluores*

APPENDIX 3
Geographical names used by Woodward and their equivalents

Data from LIPSZKY (1808), MAJTÁN (1972), KISS (1988), KODĚRA (1986–1990), and LIPOLD (1867). Geographical coordinates from PAPP (1997).

WOODWARD's names	Feature	Country (today)	German	Hungarian	Latin	Slovakian/ Romanian (RO)	Longitude (E) Latitude (N)
Altsol	town	Slovakia	Altsohl	Zólyom	Veterosolium	Zvolen	19°08' 48°35'
Bartfeld	town	Slovakia	Bartfeld	Bártfa	Bartpha	Bardejov	21°17' 49°17'
Buda	town	Hungary	Ofen	Buda	Buda	Budín	19°07' 47°30'
Cibinium *see* Hermanstad							
Comorrah	town	Slovakia	Komorn	Komárom	Comaromium	Komárno	18°10' 47°45'
Cremnitz	town	Slovakia	Kremnitz	Körmöcbánya	Cremnitzium	Kremnica	18°55' 48°42'
Danube	river		Donau	Duna	Danubius	Dunaj/ Dunarea (RO)	
–	town	Slovakia	Dobschau, Topschau	Dobsina		Dobšiná	20°22' 48°49'
Duben	?	?					
Eisenback	spa	Slovakia	Eisenbach	Vihnyefürdő		Vyhnianské kúpele	18°50' 48°30'
Eperies	town	Slovakia	Eperies, Preschau	Eperjes	Eperiessinum	Prešov	21°15' 49°00'
Glassiten	village	Slovakia	Glashütte	Szklenófürdő		Sklené Teplice	18°52' 48°32'
Gran	river	Slovakia	Gran	Garam		Hron	
Hermanstad	town	Romania	Hermannstadt	Nagyszeben	Cibinium	Sibiu (RO)	24°09' 45°48'
Hern-Grunt Herngrundt Herngrunt	village	Slovakia	Herrengrund, Herrngrund	Úrvölgy	Vallis Dominorum	Špania Dolina	19°08' 48°49'
Hungaria Hungary	country		Ungarn	Magyarország	Hungaria	Uhorsko	

WOODWARD's names	Feature	Country (today)	German	Hungarian	Latin	Slovakian/ Romanian (RO)	Longitude (E) Latitude (N)
Isol *see* Neijso							
Leibschersuffen	mining settlement	Slovakia	Lupscher-seiffen	Magurka-bányatelep		Magurka (at Partizánska L'upca)	19°26' 48°57'
Lower Hungary	region		Niederungarn	Alsó-Magyarország	Hungaria Inferior	Dolné Uhorsko	(<20°)
Neijsol = Isol Neosol Newsohl Newsol	town	Slovakia	Neusohl	Besztercebánya	Neosolium	Banská Bystrica	19°09' 48°44'
Neytra	river	Slovakia	Neutra	Nyitra	Nitria	Nitra	
–	village	Slovakia	Unter-Slana, Niedersalz	Alsósajó		Nizná Slaná	20°25' 48°44'
Presburgh	town	Slovakia	Pressburg	Pozsony	Posonium	Bratislava	17°07' 48°09'
Rosenburg	town	Slovakia	Rosenau	Rozsnyó	Rosnavia	Roznava	20°32' 48°27'
Schemnitz	town	Slovakia	Schemnitz	Selmecbánya	Schemnicium	Banská Štiavnica	18°54' 48°27'
Seben	town	Slovakia	Zeben	Kisszeben	Cibinium	Sabinov	21°06' 49°06'
–	town	Slovakia	Schmölnitz, Schmöllnitz	Szomolnok		Smolník	20°45' 48°44'
–	village	Slovakia	Thajoba	Tajó, Tajova		Tajov	19°04' 48°45'
Trium Regum vena Trium regum fodina Trium regum sanctorum	vein		Drei König Gang (bei Wihne)	Háromkirályok-telér (Vihnyén)		zila Troch Král'ov (near Vyhne)	18°50' 48°30'
Upper Hungary	region		Oberungarn	Felső-Magyarország	Hungaria Superior	Horné Uhorsko	(>20°)
Waag	river	Slovakia	Waag	Vág	Vagus	Váh	